

any specific reasons for the rejection. Moreover, the rejection of these claims as stated in the previous Office Action would be improperly maintained because the Examiner failed to respond to Applicant's traversal in the Office Action Response filed on September 3, 2002, which is contrary to M.P.E.P. §707.07(f). Should the rejection of claims 7, 12, 13 and 16-20 be maintained, Applicant requests that the Examiner answer the Applicant's traversal of September 3, 2002 and that the Applicant have an opportunity to respond thereto.

Applicant submits that the Section 103(a) rejections of claims 5-11 and 14 are also improper because the Examiner failed to state the rejections in a manner consistent with M.P.E.P. §706.02(j) and 35 U.S.C. §132. Specifically, the Examiner failed to list any patent number corresponding to either "*Camilletti et al.*" or "*Shangguan et al.*" As the Examiner has indicated that the rejections are based upon new grounds, Applicant should not be forced to speculate as to the specific nature of these references in regard to any previous Office Action. Therefore, the Applicant has not been adequately apprised of the nature of the cited references in a manner sufficient to allow the Applicant to judge the propriety of the rejection and/or continuing prosecution or filing a Notice of Appeal. Applicant requests clarification as to the nature of these references and an opportunity to respond thereto; however, for purposes of this response, Applicant is assuming that these references correspond to those cited in previous Office Actions.

Applicant respectfully traverses the Section 103(a) rejections of all of the claims because the Examiner failed to meet all of the criteria for establishing a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met, as indicated in the M.P.E.P. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claimed limitations. In this instance, the Office Action failed to meet the first and second criteria and, therefore, no *prima facie* case of obviousness has been established, as discussed below.

In regard to the third criteria above, the Office Action failed to cite portions of the references that teach or suggest all the limitations in the rejected claims. As the Examiner acknowledges on page 3 of the Office Action, the '581 reference fails to show a diffusion barrier

layer. However, in an attempt to modify the '581 reference to include a diffusion barrier layer, the Examiner has not shown how the asserted modification of the '581 reference would result in a structure as claimed in the instant application. For example, the Examiner has not asserted, nor can the Applicant ascertain, any portion of the cited references that teaches or suggests the limitations in claim 1 directed to "a metal layer over the ... diffusion barrier layer, and at least partially over, and in contact with, a portion of the passivation material not over the diffusion barrier layer." Upon brief review of FIG. 3 and other cited portions of the '581 reference, it would appear that placing a diffusion layer on the metal layer 15 would result in the metal layer 25 being only over portions of the passivation layer that are also over the diffusion layer. Therefore, none of the metal layer 25 would be over a portion of the passivation material that is not over the diffusion barrier layer. For instance, placing a diffusion layer over the entire surface of the metal layer 15 (corresponding to the metal film 200 over the bond-pad 128 in the '681 reference) would result in the passivation 22 below the metal layer 25 also being over the added diffusion layer. Therefore, the asserted modification of the '581 reference fails to teach the claimed limitations recited above.

In further regard to the third criteria above, the Office Action has mistakenly interpreted various portions of the cited references. For instance, the Examiner mistakenly asserts that passivation material 300 is a diffusion barrier layer, which is contrary to the teachings in the '681 reference (*see, e.g.*, column 4, lines 14-36). In addition, the Examiner's assertion that the metal film 200 (asserted to be a "diffusion barrier") is "arranged to mitigated inter-metallic aluminum-based compounds forming" is unsupported by the cited portion of the '681 reference. Specifically, the cited portion of the '681 reference including column 3, lines 61-67 fails to discuss any mitigation of inter-metallic aluminum-based compounds forming by the metal film 200.

In regard to the first and second criteria above, Applicant submits that the asserted modification of the '581 reference would render the reference unsatisfactory for its intended purpose. Relevant case law indicates that, where an asserted modification of a primary reference would render that reference unsatisfactory for its intended purpose, there is no motivation to make the modification (*see, e.g., In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)). In this instance, the asserted modification of the '581 reference to include a diffusion layer between the first metal layer 15 and the second metal layer 25 would defeat the purpose of the

'581 reference that includes "a stronger bond pad structure which avoids cratering." *See, e.g.*, column 2, lines 45-59. Moreover, it is unclear as to what effect removing the second metal layer 25 from the first metal layer 15 and placing a diffusion layer therebetween would have on the structure. The Examiner failed to show how the invention of the '581 reference would work were such a diffusion layer placed between the metal layers 15 and 25.

In further regard to the first criteria above, the Office Action failed to cite any evidence of motivation found in the prior art for making the asserted modifications of the '192 reference. Relevant case law indicates that, without such evidence of motivation, the Section 103(a) rejection should be removed (*see, e.g., In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999)). In this instance, the Office Action failed to cite evidence of motivation for adding the diffusion barrier layer to the structure in FIG. 3 of the '581 reference; rather, the only motivation asserted by the examiner is directed to problems discussed in the secondary '681 reference. For example, the cited portion of the '681 reference makes no mention of problems associated with the '581 reference and thus fails to discuss why one of skill in the art would be motivated to modify the '581 reference. The Examiner has failed to cite evidence that shows why one skilled in the art would look to the problems cited in the '681 reference to overcome any problem in the '581 reference. Specifically, Applicant submits that the Examiner has failed to show that any diffusion problem exists in connection with the '581 reference and, therefore, the addition of a diffusion barrier would serve no apparent purpose. Referring to the portion of the '681 reference to which the Examiner refers for motivation (column 3, lines 43-46), the metal film 200 is added only "when it is *necessary* to improve adhesion" (emphasis added). Applicant submits that the Examiner has failed to discuss and show how this metal film would be necessary in connection with the '581 reference or even to assert that it would be necessary to improve adhesion between the metal layers of the instant invention.

In view of the above, Applicant submits that the Office Action failed to meet the requirements for all three of the Section 103 criteria above. Therefore, the Office Action failed to establish a *prima facie* case of obviousness and Applicant requests that the rejection be removed.

For the reasons stated above, Applicant submits that all of the Section 103(a) rejections are improper and should be removed because each claim rejection is directed to limitations

and/or relies upon the asserted combination of references that is improper. However, the impropriety of other selected ones of the claim rejections is discussed further below.

Regarding the Section 103(a) rejections of claims 5-8, 10, 11 and 14, Applicant respectfully traverses because the Examiner further failed to cite any evidence of motivation for modifying the '581 reference to be directed to a flip-chip arrangement, as asserted on page 5 of the Office Action. As asserted motivation for this modification, the Examiner recites apparent advantages of a flip-chip arrangement in connection with the "*Camilletti et al.*" reference. However, the Examiner failed to cite any evidence of motivation as to why one of skill in the art would modify the '581 reference to include a flip-chip arrangement. Furthermore, the asserted motivation in connection with various other ones of the rejections, including the rejection of claims 6 and 10 on page 6, rely upon unsupported conclusory rationale. No supporting evidence is provided with the allegations. In addition, the reasoning stated is too general because it could cover almost any alteration contemplated of the cited references and does not address why the specific proposed modifications would have been obvious. Therefore, these rejections are further improper for lack of motivation in this regard and fail to establish a *prima facie* case of obviousness.

With particular respect to claim 10, Applicant also fails to see how the *Camilletti et al.* reference identically teaches the metal bond pad and the metal layer including the same type of metal. The cited portion of the reference (col. 8, line 8-14) provides:

... bond pad 11A can be sealed by covering it with a non-corroding conductive metal layer 16A, although in some cases, a corrodible material can be employed. Layer 16A is most preferably a gold or solder (95PB-5Sn) bump, although it can be any metal which is stable in the environment, electrically conductive, and useful for interconnecting circuits of semiconductor die 30A. Some suitable materials include copper, silver, silver filled (sic) epoxy, silver-filled polyimide, silver-filled polysiloxanes, silver-filled silicone elastomers, or silver-filled silicone resins.

Therefore, the metal do not appear to be the same and the cited reference fails to establish a *prima facie* case of anticipation; Applicant requests that the § 102(b) rejection be removed.

Applicant further traverses all of the rejections because the Examiner failed to respond to the Applicant's traversal and answer the substance thereof, as indicated in M.P.E.P. §707.07(f). Specifically, the Examiner's Response stated that "Applicant's arguments.... are moot in view of the new ground(s) of rejection." However, many of the rejections are based upon arguments

made in the Office Action to which the prior Office Action Response was directed; therefore, the traversals to these rejections should have been answered.

In view of the claim amendments, and distinguishing remarks above, Applicant believes the present application to be in condition for allowance. Withdrawal of all rejections is respectfully requested.

Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Mr. Peter Zawilski, of Philips Corporation at (408) 617-4832.

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Marked-up Version of the Claim Amendments
U.S. Patent Application Serial No. 09/874,606

In the Claims:

The following is a marked-up version of the claim amendments.

15. (*Amended*) A semiconductor chip having circuitry, the semiconductor chip comprising:

a metal bond pad over a portion of the circuitry;

a diffusion barrier layer over the metal bond pad; and

a metal layer over the diffusion barrier layer, the metal layer being configured and arranged for connecting to a wire bond, and the metal bond pad, the diffusion barrier layer and the metal layer all being insulated on at least two sides by passivation material[.];

wherein the diffusion layer is constructed and arranged to mitigate inter-metallic compounds forming as a reaction to the metal layer connecting to the wire bond, and the passivation material is constructed and arranged to be at least partially over the metal bond pad[, the passivation material] and the diffusion layer.

20. (*Amended*) The semiconductor chip of claim [1] 15, wherein the semiconductor chip is configured and arranged as a flip chip.

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